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ABSTRACT

The use of computers by institutional researchers is considered, with a focus on West Germany and Europe. Two developmental stages concerning higher education's political and economic contexts and information technology are addressed, along with the emerging tasks of instititutional research in higher education, and the functioning of microcomputers as decentralized computing power. Databases at the institutional level and statistical databases on the state and federal level operate mainly for government decision-making. Institutional research in Germany does not mean self-study for strategic planning of an individual university. Stages of information technology (batch systems, the online-system, and microcomputers) are considered. New roles for institutional researchers in Germany are projected: to enhance institutional planning, policy formation, and decision-making; to manage information; to help the end-users at the operational and strategic levels use their computers; to promote empirical investigations and the use of databases by the institutional research office; and to automate offices within the university. (SW)

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The Emergence of Institutional Research and the Use of Microcomputers: New Roles for Institutional Researchers in Western Europe Higher Education Institutions

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Ann K. Dickey, Chair
Forum Publications Editorial
Advisory Committee

Abstract

New roles for European institutional researchers derive from two developmental lines in European higher education, on the one hand the development towards a market system in higher education including a strengthened autonomy of the individual institution,on the other hand the development of information technologies which lead to a widespread use of microcomputers on the campus.

While (until recently) institutional researchers in European universities have rather been administrative data processing specialists than institutional researchers in its true sense, their tasks now combine their ability of using computers with real institutional research.

1. Introduction

At the beginning of my paper presentation I would like to tell you about the task I got from our convener: "Edgar - the personal computer and associated software made a change in our ability to design analyses to fit differing individual administrative styles and changing institutional conditions. Some of the European workshops have illustrated these applications and perhaps you would like to give us a state of the art appraisal."

When Craig Johnson first tried to draw some conclusions from the European AIR-Fora (Johnson 1983), he stated an increasing interest of institutional researchers in the use of computers, focussing especially on the question of microcomputers. However, this greater interest in information technology, is only scarcely mirrored in the contributions to the EAIR-Fora: when counting the contributed papers of the AIR-Fora from 1979 to 1985 I only found 8 of 129 papers dealing with computer applications, which seems to me to be an inadequate representation of this topic in institutional research contexts.

Table 1

Contributed Papers at the European AIR-Fora on Microcomputers

year of forum	papers on microcomputers	of papers total	contents of papers
1979	-	12	
1980	2	13	- Management Information System and Modelling System - Computer as a tool for IR-office
1981	1	7	- Computer as a tool for IR-office and decentralized administrative computing
1982	1	25	- Use of microcomputers in the administration
1983	-	25	
1984	3	23	- Decision support for managers - Tool for budget allocation - Microcomputers and top administrators
1985	1	24	- Information management and decision support

Indeed all of these 8 papers are dealing with microcomputers, which could lead to the conclusion that the new interest in information technology on the side of institutional researchers coincides with the emergence of microcomputers. This is true for the American institutional researchers, but not to the same extent for the German institutional researchers for example. They dealt with computers and data processing from the very beginning at the end of the sixties, although I must concede that what they did was not institutional research in its true sense.

To solve this enigma, I would like to

(1) go back two developmental stages concerning higher education in its political and economical contexts and information technology in higher education institutions

(2) look at the actual situation of higher education institutions with regard to
   - the emerging tasks of real institutional research
   - the microcomputers functioning as decentralized computing power

(3) trace some new tasks for institutional researchers in Europe.

My paper has of course got a bias towards the German situation, but I think that a similar situation prevails in most of the European countries. In order to point out the main trends it appears necessary to exaggerate or simplify some developments or situations to some extent.

2. Looking back to the roots of "institutional research"

German higher education institutions are state institutions, which means that they receive their funds from the states by virtue of the law. The federal state has got only minor competences in higher education although it contributes 50% of the money for investments in the institutions and tries to induce planning and coordination in higher education on a national level.

To start with an exaggeration and simplification: German higher education institutions are managed (i.e. planned and controlled) at the state level.

We have to go back to the late sixties, the time of extraordinary growth in higher education (i.e. growth of the number of students, of state money, of positions and personnel, of investments, and new institutions).

Due to the dynamics of growth the need (or I would rather say the "desire") for planning at the state and federal state level grew accordingly. But soon the lack of information for planning was recognized and the idea of a national Management Information System (MIS; compare the name of the author's institution: HIS) was created.

Higher education was regarded as a total system on the national level (total system approach). A national data base with higher education data should be fed from institutional data bases with data on students, personnel and positions, space and equipments, and finance.

Soon this idea was fixed by law and higher education institution were forced to deliver these statistical data to statistic offices at the state and federal state level.

"Institutional research"-offices were created at the institutional level, called "Planning and Information Centres" (PIZ). Their task was to keep up the data bases on the institutional level and to maintain the cyclical delivery of data to the state level. Their invention marks the birth of the German "institutional research".

Let us now take a closer look on three elements of this system: (1) data bases and decision making, (2) institutional researchers, (3) information technology.

Data bases and decision making

The data bases on the institutional level and the statistical data bases on the states and federal state level did not mainly operate for the sake of the institution but for the state decision making. As the data were delivered in pre-structured and in pre-programmed reports and as it also took a long time to prepare "official reports" it turned out to be necessary to conduct additional surveys (samples) and investigations in order to answer up-to-date questions important for specific political decision making processes.

We are proud that today we have very good, up-to-date and longitudinal data (and instruments to acquire these data for future needs) especially on students and alumni, for example on reasons to enroll at the university, choice of majors, time spent at university, drop-outs, motivation, behaviour, social data, financing of studies, changing majors, carreer of alumni, etc.

As these surveys are conducted outside the institutions we must concede that the data is only available on a state or national basis and again proves to be "institutional research" for state decisions.

With the growing demand for higher education of a greater part of the youth and with the scarce state finances the idea of (computer aided) models to enhance the higher education planning was born, for example ressource requirement models (in Germany: "Kapazitätsmodelle", in the United States f.e. RRPM), cost accounting models, and indicator models.

All these models were built up to reflect the structures among the basic data elements of a "university production process".

The models were never used in practice. They failed for several reasons (not all reasons are true for all models):

- they were initiated on the state level. Universities did not cooperate because they feared to strengthen the managing capacity on the state level and universities were not interested in the transparency

of their "production processes".

- the data collection was supposed to be too expensive and too extensive

- the models would replace, not support decision making.

Institutional Researchers

We now should compare the activities of the German "institutional researchers" with the definition of institutional research: "Institutional research is research conducted by an institution of higher education in order to provide information which supports institutional planning, policy formulation, and decision making ... The subject of institutional research is the individual college, university, or system, and results which have implications beyond this subject are not sought." (Saupe 1981).

The German institutional researcher, although located on the institutional level, but preparing data to be delivered to the state level is not an institutional researcher in the true sense of Joe Saupe's definition. Institutional research in Germany does not mean self-study for strategic planning of an individual university.

Indeed if the individual institution is managed from the State level there is neither opportunity for planning and decision making nor need of information on the institutional level. A study at the end of the sixties on German chancellor's (head of university administration) day-to-day activities showed that less than 10 % of their activities consist of "decision making" (Brinkmann, p.85).

At the 1985 EAIR-Forum Peter Massen reported about another study on institutional research in Europe: "The main image with respect to institutional research in the field of higher education in Western Europe which emerges from our study is that institutional research as a seperate administrative function within higher education institutions does not exist in Western Euro-

pe". (Maassen 1985, p.3) "The more a higher education system in a country tends to move in the direction of autonomous choice and market exchange, the more need there will grow in that system for the use of institutional research as an instrument to measure institutional performance" (Maassen 1985, p.7, compare the triangular model of coordination in Clark 1983).

I have to focus on another activity of German institutional researchers not mentioned before. In order to keep up the data bases and the flow of data towards the state offices the researchers implemented data processing systems at the basic level of the operational activities of the university administration. Thus the main task of institutional researchers within the university turned out to be the support of rationalization of university administration with electronic data processing, the statistical data being a by-product of these activities.

Now I hope the difference I made before has become clear: American institutional researchers are interested in computers as soon as computers provide a really fast and flexible access to data and as soon as semi-structured decision problems are supported by computers (microcomputers!). German "institutional researchers" have been in touch with computers from the first days they took up their work, because they maintained administrative data processing.

Information technology

At the time being German "institutional researchers" are working on the third generation of data processing systems and information technology for the administration of German higher education institutions. To repeat once more: information technology does not only maintain data bases but supports operational administrative tasks inside the university.

The first generation can be called the batch-system generation, with only centralized computing power and rather unflexible support of operational administrative tasks.

The second generation the online-system generation, is characterized by users having their own terminals, transaction oriented data-processing and real-time updating of data files. This generation of information technology and administrative software enables the employees in the university administration to get their work done efficiently and quickly. Apart from this operational support good retrieval functions enhance decision making on the dispositional level, for example:

Within a few seconds the leading budget officer is informed at any time about the use of university sub-budgets (budget control) as well as the personnel officer receives information about actual or future vacancies.

At the moment the German "institutional researchers" are working on the transition to the third generation of administrative computing. Whereas the second generation brought the data bases closer to their users, the third generation of administrative university computing will bring the whole computers to their users, to their desk-tops. This is the generation of the decentralization of data processing, the time of microcomputers.

The emergence of the microcomputers was accompanied at the same time by a significant qualitative amelioration of the user interfaces of the implemented software-products so that the computer really can be on top of everybody's desk.

Microcomputers will soon be found

- in very small higher education institutions for their operational data processing
- in academic departments and sub-departments for administration and decision making
- in administrative departments and sub-departments
- for personal computing at the desk-tops

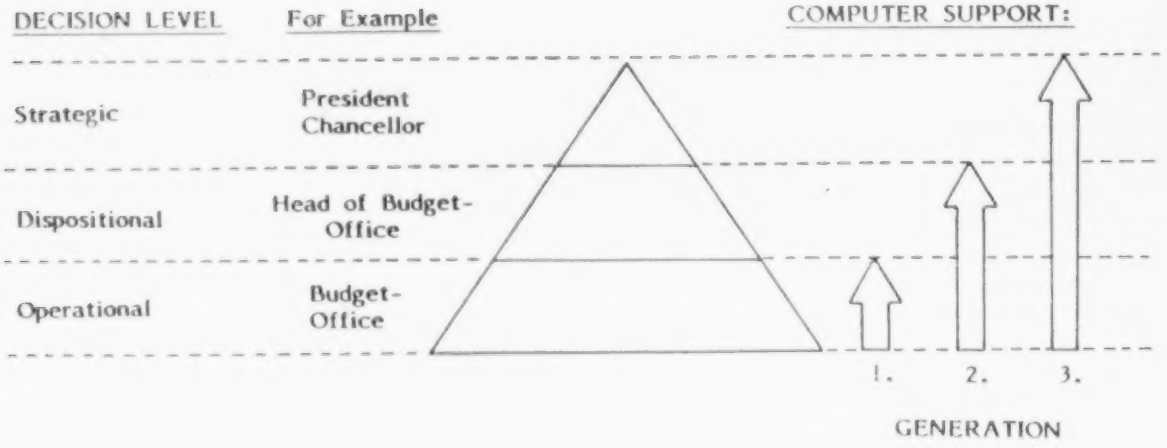
- at the desk-tops of institutional managers (presidents, vice presidents, chancellors, administrative leaders) with small data bases and decision support systems

- in the institutional research offices.

The three generation thesis of the data processing development in higher education administration on the institutional level shall be summed up by the following illustration showing the link between data processing support and the wellknown decision pyramid:

Figure 1

The Three Generation Model of Data Processing
in Higher Education Administration
(Institutional Level)



To complete the generation model I should mention that according to my opinion the next generation will be called the generation of re-integration. One of the integrative functions will focus on the integration of office automation and data processing. I will come back to this problem later.

3. The emergence of institutional research

The development of information technology and the software support of German "institutional researchers" might lead to the microcomputers and the afiliated software products being on the desk-tops of presidents and in the institutional research office. But so far neither the president's nor the institutional researchers' need of microcomputers for decision support and decision making have been explained in my presentation, because when universities are managed by the State, management information is not necessary on the institutional level.

To stress my thesis of the emergence of real institutional research in German higher education institutions I have to trace another line of development, which I want to call the changing political, economic and societal environment of the higher education institutions.

Let us call the first phase of this development the expansion phase and start our consideration again in the sixties (end of the sixties/beginning seventies). This phase can be characterized by a lack of financial problems in higher education. It was unproblematic for the politicians to justify that more and more money had to be invested into higher education. Young men and women were even encouraged to enroll at universities by financial and educational means. It was a time of immense planning efforts on the state and federal state level.

The second phase might be called the efficiency phase (beginning seventies to midth of the eighties). As soon as the demand for higher education exceeded the capacity of the higher education institutions, as soon as the state funds for higher education proved to be limited, the states tried to introduce the idea of effenciency in higher education institutions. The models I

mentioned can be regarded as state efforts to shed light on the higher education production function under the auspices of efficiency. The electronic data processing systems located in the administration were of course helpfull for the universities to enhance their efficiency. But if we remember efficiency being the relation between input and output, and higher education output not being easily quantifiable, efficiency turns out to be an activity of reduction of state funds' input into higher education.

Indeed a relative reduction of state funds in higher education has been observable since the days of expansion in higher education, although the enrollment figure did not stop to increase until now. But today higher education institutions have to face two additional challenges other than financial problems: a slow but probably soon accelerating enrollment decline due to demographic trends and perhaps due to labor market problems, and a public opinion which does not leave the universities' performances unquestioned.

We can conclude that now a phase is reached in which higher education institutions have to care for their own survival (ranging from cure of illness, to mere survival, to strive for excellence (Cameron 1984)). I call this phase the effectiveness phase, and regard a higher education institution being effective as far as it attains the goal of survival in the sense mentioned above.

The three phases can be differentiated by the question of wether the main activities lie on the state or the university side:

Figure 2

Phases of Higher Education Environmental Situation

PHASE	ACTIVITY ON THE SIDE OF	ACTIVITY
EXPANSION	STATE	INCREASING FUNDS FOR HIGHER EDUCATION, ENCOURAGING THE YOUTH TO GO TO UNIVERSITY
EFFICIENCY	STATE	MODELS CAPS FUND REDUCTION
EFFECTIVENESS	HIGHER EDUCATION INSTITUTION	SURVIVAL (CURE FROM ILLNESS, MERE SURVIVAL, STRIVE FOR EXCELLENCE)

I should add some more traits of the effectiveness phase: what we find in the German situation is a slight tendency of the states to give more autonomy to the institutions:

- laws are changed to foster the spending flexibility of funds on the university side
- the allocation of budget cuts are left to the institutions' own discretion
- first attempts to give the right of curriculae construction to the universities can be seen
- discussions to "introduce" competition into the university system are initiated.

If this direction of changing patterns in higher education continues, a reverse shift of management, decision making, need of information and decision support will occur:

Figure 3

Shift of Management Activities in Higher Education

On the side of the individual university new problems will have to be solved:

- identifying the institution's specific role and mission
- finding the market niche
- self-evaluating the institution's performance
- setting priorities in fund allocations
- aiming at the survival of the whole university

- enhancing public relations.

The time has come for institutional research in its true sense to support these management activities. Indeed, German university managers started asking for the support of institutional researchers to foster this kind of institutional decisions.

4. New roles for institutional researchers

As a result of the before-said, we have to take the following two facts into account when considering the new roles for German institutional researchers:

(1) the emergence of institutional research in its true sense as an activity to enhance institutional planning, policy formulation and decision making

(2) the distribution of data processing capacity with the widespread existence of microcomputers and comfortable software within the university.

The emerging activities of German institutional researchers will be a consequent continuation of their concern for the use of computers in higher education institutions. Six tasks of the institutional researchers can be identified:

The original institutional research task

With the emergence of the need of real institutional research the original institutional research tasks have to be fullfilled, which can be briefly characterized as follows:

- "self-study" of the individual institution

- "market analysis", focussing on the environmental conditions of the individual institution.

I need not say that these tasks are not fullfilled sufficiently by maintai-

ning the administrative data bases that are now mainly used for internal purposes instead of being delivered to state statistic offices at the same time.

Special investigations have to be conducted, as well as self-evaluations of institutional performance, institutional goals and functioning studies, educational outcomes studies etc. in order to support ad hoc and strategic decisions of institutional managers. What makes the difference for institutional researchers' situation now compared with former phases is that they have to look beyond the bounderies of their individual institution, they have to conduct follow-up studies, look at regional demographies, local images and public relations.

The information manager task

The information manager task of institutional researchers derives from two facts:

(1) To the same degree as the individual institution receives more autonomy from the state it has to find its own way of positioning itself within the higher education market, or more general: environment. The institution has to consider itself as a whole unit. The object of research is not any longer the student, the equipment, the personnel on its own, but in the institutional context. The object of research is the institution as a whole.

(2) With the microcomputers being distributed all over the campus and with a decentralized data processing the advantage can be attained that much more data are available on computers (which means comfortable retrieval), but to really get these data for central decision making and integrated decision support the obstacle of decentralization of data has to be removed.

Exactly this is the task of the institutional researcher as an information manager to transform the decentralized data into integrated management information for the institution as a whole. He "serves the institution by identifying, clarifying, informing and coordinating key institutional decision." (Krieg-

.baum 1980)(Delaney 1985, p. 10)

The information manager knows where to get the relevant data files on the campus, he/she is familiar with the retrieval problems on microcomputers and mainframes.

The information center task

End-users of information technology, especially microcomputer-users will provide for their own computer applications. German institutional researchers are traditionally skilled in computer technology and they know very well the basic problems of higher education administrative departments.

With the information center task, the institutional researchers have to

- help the end-users at the operational as well as at the dispositional and strategic level of the university administration to use their (micro)-computers by
  - * counselling at the stage of purchase of microcomputers
  - * teaching the use of standard software and high level programming and retrieval languages
  - * teaching the use of hardware and operation systems
  - * providing prototyps of applications
- guarantee the integrity and actuality of data on the campus
- keep up a valuable data dictionary for all users
- avoid redundant applications.
  (Martin 1985, p. 143-172, Schlemmer 1986)

I just want to repeat, what Berhard Sheehan stated at the Portland Forum: "It may well be that the path to institutional research prominence in decision support management will include apprenticeships as an information center." (Sheehan 1985)

The decision support system task

One of the microcomputer user groups will be that of the decision makers within the higher education institution, that is the president, the vice presidents, the chancellor and the others. Some of them will have their own decision support systems and small data bases on their microcomputers, others will not use microcomputer on their own.

For those not having microcomputers at their disposal the institutional researchers will function as the users of the decision support systems and the demonstrators of the results (compare Johnson and Tuckman 1985).

For those decision makers who use microcomputers on their own the institutional researchers will have to provide for the small data bases and the integrity and actuality of the data.

Support does not only mean data and information, but also use of data, that is "modelling" in the context of decision support systems. The decision maker will not use the microcomputer and the software unless he/she is able to use it like paper, pencil, scotch tape and calculator. "The user of the DSS must be comfortable with the system - both conceptually and technologically." (Silver 1982)

The institutional researcher has to

- teach the decision maker how to use the hardware and the software
- prepare the user interface of the software, "that it is compatible with

the thinking style of the decision maker" (Mayo 1984).

- develop formats of recurring questions and problems to be solved (Johnson 1983).

- find out new decision support software that fits best to the personal style of the decision makers and the problems to be solved.

The more decision makers use their own hardware and software, the more institutional researchers are facilitators and consultants and the least programmers (Keen 1982).

The institutional research information system task

One of those to profit from decentralized computing power is the institutional research office itself. It will use its own computer or microcomputer. The institutional researcher will have four tasks to fullfill with their own computer:

- using statistical software packages to support their empirical investigations and surveys

- maintaining longitudinal data from cyclically conducted investigations

- maintaining data bases derived from the institutional administrative files

- maintaining data bases on data of the institutional environment.

The office automation task

The last task I want to mention seems very essential to me. It suggests the institutional researcher to support his/her institution to step into the next generation of information technology, the generation of re-integration of da-

ta processing and office automation.

What is true for campus computing, is true for decision makers in the university as well: "Since most of the work in colleges and universities deals with words and images, not numbers, the greatest future growth in computing will be in support of individuals who have not been represented in the traditional community of computer users." (McCredie 1982) To translate this statement into the president's case: For his decision making the president does not only need "numbers" from inside and outside the university, what he needs for a decision I would like to call a "bundle of information packages", that is for example

- memos he has written several weeks ago
- memos another person has written even a year ago
- a letter from the state ministry
- a special part of a state law
- a proposal from a faculty member
- an article from a newspaper
- or even a paper from an AIR-Forum, that might be found in the university's record-office.

What he might need in addition is to deliver this information very quickly to other persons inside the university or get it mixed with numbers and own comments, etc.

I think it is not quite sure how these problems can be solved by office automation technology for all the mentioned details, but it is sure that office automation will support these information retrieval and dissemination tasks by any rate. Anyway, institutional researchers should try to find the path to integrate data and office automation as soon as information technology allows.

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